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## Original Articles.

### ELECTROLYSIS IN THE TREATMENT OF TUMORS OF THE BLADDER.\*

By ROBERT NEWMAN, M. D.

New York.

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LECTRICITY has done much to make the treatment of tumors of the bladder more successful than the means formerly employed. It can be used in three different forms:

First: Electric light to make the diagnosis positive Second: Galvano-cautery to remove the tumor wholly or in part. Third: Electrolysis for the removal or absorption of the tumor by degrees, while the patient is perambulant.

Radical operations have been made by supra-pubic cystotomy and removal of the tumor, either by exsection or by galvano-cautery.

\*Read at the third annual meeting of the American Electro-Therapeutic Association, in Chicago, September 12th, 1893.

The present paper will illustrate only methods the author has employed with electrolysis, in such a manner that the patients were not detained from business or pleasure, came to the office for treatment and went home after the seance, sometimes necessitating travels by rail. Most patients were females, but the principles employed can also be used in males. The only difference in treating males consists in having the instruments made a little longer to comply with the anatomical differences. Only non-malignant tumors were treated in the manner described.

*Non-malignant tumors of the bladder* have been described by many authorities, which to cite here would be out of place. Recently an excellent paper on this subject has been written by John B. Hamilton (1) M.D. L.I.D., which is a concise essay, almost exhausting the subject, and giving much information. The authors cited there are Stein, Thompson, Tuffier, Ricard & Bousquet, Watson, Southan, Dittel, Wallace, Perregaux, Jewett, Norton, Guyon, Barling, Spauton and Kelly.

(1) Journal of American Medical Association, May 20, 1893, page 553.

We find in this paper the very good classification of non-malignant tumors by Barling; the history, etiology, pathology, symptoms, diagnosis, treatment and statistic tables. The treatment described is surgical, but not a word is said about the use of electricity. Hence all which can be found in the literature on the subject is omitted here, and only the methods of electricity employed by the author and his instruments used, and which are considered new, will be described.

The tumors which appear in the bladder are of a different character, as enumerated by Barling, Gouldson and others. Tumors which came under the author's observation were mostly papilloma, myomata and vascular. (Angiectasia venosa.)

*Diagnosis.* The malady is suspected by certain symptoms, as pain, irritability, frequent micturition, chills, insomnia, general malaise, hematuria in intervals, sudden retention, the abnormal state of the urine, etc.

1. *Ocular Inspection.*—However, a diagnosis can only be made with a certainty by ocular inspection of the bladder. This is made by the cystoscope and endoscope. The cystoscope of Leitor is illuminated by a storage battery, and if successful, the experienced operator will see the tumor—rather a little magnified—as plainly as in a good bright daylight. The cystoscope will not be always successful, but when it reveals the tumor, the diagnosis is a certainty. To verify such a diagnosis made, the author uses also the old Desormeaux endoscope immediately after the cystoscopic examination. If the same condition is seen, as found before by the cystoscope, the location of the tumor is verified by an exact measure, how far the tumor is situated from the meatus, and how far it is either right or left of the median line. If such a measure is taken carefully and embodied in the notes of the case the tumor can be found again with any instrument to be employed hereafter.

Writer has used the endoscope of Desormeaux successfully since 1866 in diseases of the urethra and bladder. In examination it shows the parts as they really exist at the end of the endoscopic tube, and there in loco with instruments

and solutions can be reached, but only to the extent of the focus in sight; other places may be reached by changing the tube to another focus. The diagrams shown here will explain best the endoscope, which has been used very little by the profession. The advantages of the cystoscope are, that it gives a better light, magnifies the parts, and the whole bladder can be explored, giving at once a larger field in foco; but it serves only as a means for diagnosis.

For direct ocular inspection Dr. R. T. Morris has invented an excellent endoscopic tube which is very simple, the light thrown into it through a head mirror. The management of either appliance needs some practice. So far, author has had the best results, and was enabled to make a positive diagnosis by employing both the cystoscope and the endoscope in succession, as also before and after using electrolysis. Other examinations for diagnostic purposes are made by exploring the bladder with a bougie à boule or a sound, and by injection or irrigations of the bladder in order to find the capacity of the viscus, the state of the walls, its mucous linings, abnormal contractions and the sensibility of the patient.

*Benign tumors* in the bladder may be of different varieties as mentioned in text books.

In figure 1 will be found illustrations of some tumors which have come under the author's observation, as seen through the cystoscope and endoscope.

Fig. 1 represents a myomatous tumor, springing from the muscular wall of the bladder, raised and standing on a wide base like an acorn shaped body; sensitive and painful on touch; does not bleed.

Fig. 2. Angiectasia venosa, a chain of varix, of a dark blue color, extending like a chain of berries in a line of irregularities, stretching on the fundus of the bladder  $1\frac{1}{2}$  inches above the neck in a transverse direction. The tumor was painful, irritable to the touch, and bled only a little at certain intervals.

Fig. 3 represents the same tumor as Fig. 2, as it appeared after it had been treated a few times by electrolysis, showing a similar change as can be observed in a nævus after electrolysis has been used.

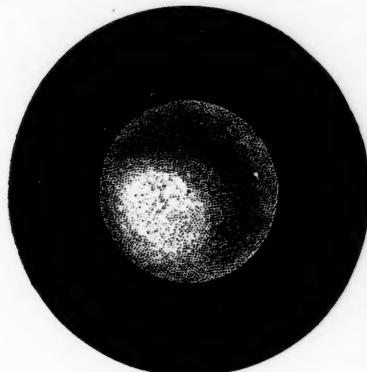


Fig. 1

MYOMATOUS TUMOR OF BLADDER.

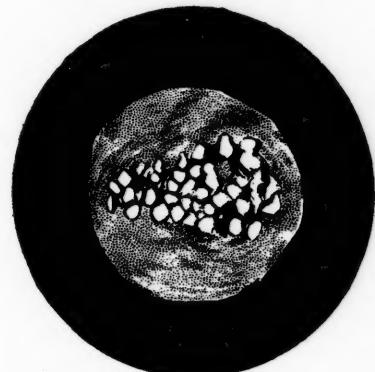
FIG. 2 AND 3 TUMOR OF BLADDER.  
*Angietasia Venosa.*

Fig. 2

APPEARANCE OF TUMOR BEFORE TREATMENT.



Fig. 3

TUMOR AS SEEN AFTER SOME ELECTROLYTIC  
TREATMENT.

The tumors have been cured by electrolysis per urethram, and therefore pathological and microscopical specimens could not be procured.

*Treatment.* Concomitant with the electrolysis or as a preparatory treatment measures are employed to make the patient comfortable. To allay pain anodynes are given, best in the form of rectal suppositories, and external galvanisation. The tone of the bladder must be restored, and the troublesome spasms conquered. Medicated injections, washing out and irrigating the bladder are important. Systematic and very graduate dilatations of the bladder succeed so well that the viscera will soon tolerate twelve ounces to a pint, when formerly it could hold scarcely four ounces.

2. *Galvano Cautery* will do good service in removing the tumor by degrees. After the tumor is well located, the galvano cautery instrument is marked by a ring in such manner, that after introduction the platinum wire will cover the tumor in the bladder when that part of the instrument marked by a rubber ring appears at the meatus. Then the fenestrum containing the platinum wire is pressed downwards against the tumor, and by pressing the current breaker a few times on a screw the platinum wire is instantaneously heated from a storage battery. The instrument is almost identical with author's galvano-cautery sound, and only differs in being shorter and almost straight at the end. The two poles run inside a tube insulated, so that nothing will be heated but the platinum wire situated in the fenestrum.

Author has never failed to galvano-cauterize the exact place wanted, which fact was verified by an ocular inspection with the cystoscope. However, if there should be any doubt about the exact situation, the operation can be done with the place to be operated upon fixated while the bladder is illuminated with the cystoscope. In the same manner a galvano-cautery sling may be used to remove a tumor at the pedicle.

3. *Electrolysis* may be used in different ways, but always under all circumstances a galvanic battery is necessary, no other will do, or in other words the constant current of a galvanic battery is impera-

tive. As a rule the negative pole is applied to the affected part. The positive pole in the shape of a pad or a covered carbon is held in the palm of the hand, or pressed externally over the supra-pubic region.

Each séance may last from five to fifteen minutes as indicated by method and circumstances. The strength of the current is from five to twenty milliamperes, an average of ten m. a.

The intervals of séances are governed by the result of each operation and by the condition of the patient.

The first step in the *modus operandi* is to draw off the urine, which can be done with the urethral glass speculum. Fig. 6, which is a very useful auxiliary, as will be shown later. If necessary, the bladder is washed out through the same glass speculum, and at last four to six ounces of clear water are left in the bladder. This water may contain a little table salt, or bi-carbonate soda, which facilitates the electrolytic action. In most electrolytic operations in the bladder it is of great importance to have the bladder filled with water, and when the cystoscope is introduced, the water is a necessity to keep the electric lamp cool. Without the water the lamp would burn the mucous lining.

After these preliminaries the electrodes are applied, each in its place and the electrolytic action begins, the current being gradually increased from zero to the desired strength.

*Different Methods of Electrolysis.*—There are principally two methods—general and localized.

1. *General Electrolysis* is accomplished by holding the electrode bulb in the water, which fills the bladder, without touching the tumor. The electrode Fig. 4 is insulated except at its extremities. One extremity has an olive metal bulb which is introduced as the negative pole per urethra into the bladder and held beneath the water without touching the tumor. The positive pole in the shape of a pad is held in the hand or on any cutaneous surface which completes the circuit. Then the current from a galvanic battery is slowly and gradually increased to the desired strength and the electrolytic work begins—from the water to the tumor. It is surprising what good

effect this general electrolysis has on the tumor and on the general condition of the patient. It allays pain at once, makes the patient more comfortable, and has a specific, absorbing and healing effect on the tumor. The latter effect is slow but steady.

Other advantages of this method are, that it can be done often, in fact almost daily, or in the intervals between other localized operations, which saves time and encourages the patient, who never complains of any pain during such séance. When tumors were almost removed, but a vestige left, which scarcely could be reached locally without encroaching on sound tissue, this method of general electrolysis has done such good service, that the case was finally cured.

2. *Local Electrolysis*—Negative pole against the tumor or penetrating the same.

(a) Electrode metal bulb in contact with tumor.

(b) Platinum needle in tumor.

(c) Fixation of tumor and platinum needle in tumor.

(d) Cannulated platinum needle direct in tumor, with or without fixation.

There we have four methods, from which one can be selected according to indications, and the work to be done.

(a) *Electro metal bulb in contact with the tumor.*—The same electrode, Fig. 4, as described in general electrolysis, is also used for this method. The only difference from the former is that the metal bulb is firmly held against some part of the tumor and in contact with it. After a certain time, when the electrolysis has acted enough in one place, the point of the electrode may be moved to another part of the tumor and changed successively to different parts.

(b) *Platinum Needle in Tumor.*—This and the next two following methods are made on the same principle as the electrolytic treatment of naevus. The negative needle is introduced into the tumor and then the electrolytic action absorbs or destroys the tumor. This electrolysed portion shrivels up, contracts, heals by degrees till a healthy surface appears.

The urethral glass speculum, Fig. 6, is introduced so far into the urethra that its end is near the entrance of the bladder. Into the speculum the platinum needle,

FIG. 4.



ELECTRODE FOR GENERAL AND LOCAL ELECTROLYSIS.

FIG. 5.



PLATINUM NEEDLE.

A.—Platinum Point.

B.—For connection with battery.

C.C.—Part Insulated.

FIG. 6.



URETHRAL GLASS SPECULUM.

FIG. 7.

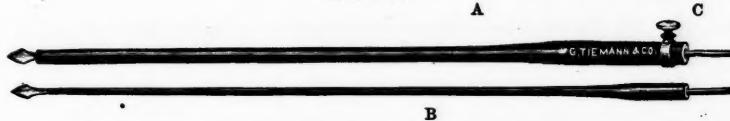


VESICAL TENACULUM CACHE.

A.—Tenaculum covered by the safeguard.

B.—Tenaculum free, safeguard open.

FIG. 8.



CANNULATED NEEDLE ELECTRODE.

A.—Needle complete inside cannula.

B.—Needle removed from cannula.

C.—Screw fixating needle.

Fig. 5, is so far advanced that its end is near the opening of the speculum. Then with a quick movement speculum and needle are pushed into the bladder, and at the same moment the needle is pushed

forward to be left in the bladder, while the speculum is removed without discharging the water left in the bladder. Then the needle is pierced into a part of the tumor and electrolysis used as before.

Sometimes it is a little uncertain where and how deep the needle passes, and in such doubt another method may be practiced. However, an operator who has sufficient experience will overcome such uncertainties, and if necessary he can see the needle's action and location by using at the same time the cystoscope, which has been done.

(c) *Fixation of Tumor and Platinum Needle in Tumor.*—This and the next method are nearly the same in principle as the last described. The difference is only a greater certainty in the location of the needle by a new instrument devised by the writer, "The vesical Tenaculum cache," Fig. 7. The Tenaculum is protected at the end by a safeguard which can be moved and thereby leaves the tenaculum free and exposed. This tenaculum runs in a very slender stem, which when in the urethra occupies little space and permits other instruments to pass alongside at the same time. The tenaculum is introduced closed as shown in Fig. 7 a, when in the bladder the safeguard is withdrawn Fig. 7 b, and the tumor fixated and held firmly by the tenaculum. Then if the safeguard is pushed forward, the tenaculum can not disengage itself from the tumor and has a steady hold on it. If there is any doubt about the location of the tumor, the cystoscope can be introduced along side of the tenaculum and the latter can be seen and guided into the exact location desired. Then the cystoscope is removed and the needle introduced into the tumor, the stem of the tenaculum acting as a guide. Electrolysis is applied, the instruments removed, and if desired the parts may be inspected again with the cystoscope.

(d) *Cannulated Platinum Needle Direct in Tumor.*—For this method another new instrument is used, "The Cannulated Needle Electrode," Fig. 8. The needle inside the cannula is fastened by the screw c at such a place that the sharp point is covered by the cannula. Then the cannula is introduced in the bladder, its open end pressed against the tumor, and at the same time the needle is pushed forward as far as it can go. Fig. 8, a. The screw c fastened again. In this position the needle fills out the cannula so firmly

that no water can escape from the bladder, the point of the needle projects out of the canula scarcely more than one-eighth of an inch. If the needle is now forcibly pushed into the tumor it cannot penetrate further than one-eighth of an inch, and therefore cannot do any harm. If it is desirable either the tenaculum or the cystoscope may be used at the same time. However, there is scarcely a necessity for doing so, as writer always found the exact spot he wanted to penetrate, which was verified by a subsequent inspection with the cystoscope. This instrument proved to be invaluable in these cases for diagnosis and treatment. It is hoped that it will be still more improved so that it is easier to inspect and operate at the same time.

The new instruments here demonstrated have contributed greatly to the success of the operation. These instruments have been devised by author as necessity required, and been manufactured by Geo. Tiemann & Co. in New York.

In most cases it will be necessary to use both local and general electrolysis, the method to be selected according to indications.

*Conclusions.*—(1) Tumors of the bladder in the male can be treated by electrolysis, but in most cases it will be preferable to perform suprapubic cystotomy and remove the tumor by galvano cautery, electrolysis or the knife for a radical cure.

(2) The methods here described for tumors of the bladder have been used in females in *non* malignant tumors. A galvanic battery only must be used.

(3) All operations have been made per urethram without any assistant, without any anesthetic, without any pain, without any detention, patients being perambulant, coming and going as they pleased.

(4) The result having been very satisfactory, patients acknowledging a cure, and in some cases reliable physicians having made examinations and pronounced patient cured.

(5) While the result has been favorable, it is not asserted that electrolysis will cure all benign tumors of the bladder.

## Society Report.

### ABSTRACT OF THE PROCEEDINGS OF THE THIRD ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

AUGUSTIN H. GOELET, M. D *President.*  
Held in Chicago, September 12, 13 and 14.

FIRST DAY—September 12th.

#### MORNING SESSION.

THE association was called to order by the President, Dr. Goelet, and after the transaction of some routine business, the President delivered the annual address, taking for his subject "The Influences Governing the Progress of Electro-Therapeutics."

He said that last year in a spirit of humor the association had been referred to as a vigorous infant, but its vigor was readily explained when it was remembered that it boasts of three parents. In the beginning it was predicted that it would never prosper, but would die young—even before the completion of its first dentition. He thought, however, that its present state of health and prosperity was sufficient evidence that it was destined to a long life of great usefulness, and a ripe old age. He thought the inauguration of this association marked an event in medicine quite as important as any that had occurred within the present century, because it established a recognized position for an important and long neglected branch of therapeutics. The need of such an association was quite evident to any one who had attempted to present technical papers upon electrical subjects at other medical societies where there is usually so much unreasonable opposition to electro-therapeutics that profitable discussion is impossible.

The work thus far accomplished he considered very creditable for so young an organization, particularly as the field is entirely new and in the beginning involved much uncertainty. He emphasized the fact that the methods adopted must bear investigation and the stamp of scientific reasoning. Results, he said, may be doubted, but methods based on scientific laws could not be questioned.

Electro-therapeutics must contend with

the natural opposition by the profession to every new inroad upon old and established methods. The fact that it is not more universally employed is due to a want of appreciation and was attributed to restricted medical education and unfamiliarity with electro-physics and electro-physiology. Some of the more progressive of medical schools, he was pleased to observe, were beginning to realize the necessity of teaching this branch of therapeutics. The imperfections of past methods, which were certainly unscientific, likewise operated greatly against a proper appreciation of modern electro-therapeutics. This could be overcome by diffusing a more general knowledge of the true position occupied by electro-therapeutics, and its successful accomplishment depended greatly upon the character of the work done by the association, and upon the personality of its members.

The progressive spirit of the association was well shown by the fact that there were no less than six committees charged with investigating scientific questions having an important bearing upon the different branches of the subject. He regarded the admission of other scientists from the electrical world to membership in the association a step in the right direction, and further evidence of its progressive nature.

He recalled the fact that within the past five years scarcely a year had elapsed without the development of some new and important feature involving the application of electricity in some one of its forms. As an instance of this, he cited the development of metallic electrolysis and its extensive application; also the alternating sinusoidal current of D'Arsonval and the capabilities of the interrupted induced current obtainable from modern apparatus.

The important improvements that have been made within the past few years in induction apparatus, whereby an increased frequency of interruption and an increased electromotive force of the current was obtained, he thought deserved especial mention. The possibilities of this current, from a therapeutic standpoint are quite beyond the conception of any one who has not had a practical clinical experience with it.

The program of the present meeting gave abundant evidence of the advanced thought and work which have characterized the association ever since its inception, and it was evident that electro-therapeutics is steadily progressing toward an exact science.

Attention was directed to the fact that, though concerted effort for electro-therapeutics is still young, its influence upon the views prevailing in medicine is already distinctly manifest.

In conclusion, the President declared that by conjoint efforts electro-therapeutics would be brought to that scientific plane which would make its most strenuous opponents their most cordial supporters.

The next order of business was the reading of "Reports of Committees on Scientific Questions."

*On Standard Coils.*—The chairman of this committee, Dr. William James Morton, of New York, said that the subject was so large, and each month was bringing so many new facts, that it seemed premature to make a report as to what should constitute a standard coil. On motion, the committee was continued.

*On Standard Meters.*—Dr. Margaret A. Cleaves, of New York, read a report of this committee. The report stated that a good meter should possess a clear, legible scale of long range, and should be so constructed that it could be easily read by the operator while at work; that although in itself a shunt is not disadvantageous, it is undesirable because of the possibility of its heating and thereby changing its resistance; that the instrument should indicate in all positions, and is preferable when constructed to indicate with the current passing in either direction; that it should be very portable and lastly that it should not easily get out of order. Instruments of the galvanometer type were considered to be inaccurate on account of the magnetic influence exerted by surrounding objects.

Then followed a detailed description of the nine meters which had been submitted to the committee for examination, and the tests to which these instruments had been subjected. The report concluded with the statement that in the opinion of the committee the two meters which most nearly fulfilled the requirements were the

Weston and the Kennelly meters, and the association was urged to adopt at once a standard meter.

The report called forth a long and earnest discussion as to the advisability of adopting at present a standard meter. Some of the members were of the opinion that one of the meters especially recommended by the committee had not been sufficiently long before the profession to enable many of those present to pass intelligently upon its advantages or disadvantages, and they therefore deprecated hasty action. Others thought it was impossible to combine in any one meter all the points a meter should possess in order to render it a thoroughly reliable instrument for all kinds of clinical works, and they consequently favored the adoption of two types of standard meters. It was also suggested that to avoid unnecessary discrimination the association should adopt a type of meter as a standard rather than a standard rather than any one particular instrument. The report of the committee was finally accepted and the chairman of the committee continued.

*On Static Machines.*—Dr. Morton reported that in order to pursue their investigations systematically a number of questions had been sent out in a circular letter, but no responses had been received.

The committee made the following recommendation: That electro-static machines adapted to medical practices should not have less than four revolving plates, and that the diameter of these plates should not be less than twenty-six inches. The report of the committee was accepted and the committee continued.

*On Constant Current Generators and Controllers.*—Dr. W. J. Herdman, of Ann Arbor, read a carefully prepared report on this subject in which he considered in detail the work accomplished by the various batteries which had been submitted to him for examination. No secondary batteries had been submitted and, mention of one or two batteries which had only been very recently sent in was omitted for lack of time to make the necessary tests. On motion the report was accepted and the chairman of the committee continued.

*On Electrodes.*—Dr. A. Lapthorn Smith, of Montreal, read a report of the committee. The committee expressed the opinion

that the best ground work of all electrodes is copper wire gauze, and that the connection is best made by copper wire soldered the whole length of the gauze and terminating in a binding post—that known as No. 632(?)—which is largely used by telephone companies throughout the world. Clay was considered the best covering as it was the only substance which could be rendered moist enough to conduct properly without at the same time soiling the patient's clothing. It should be half an inch thick and of the consistency of putty. Before each application it can be readily cleaned by washing its surface with soapsuds. The back of the electrode is insulated with common table oilcloth.

The committee recommended three sizes of dispersing electrodes, viz.: each having a uniform length of one foot, and the width three, six and nine inches respectively. It was desirable that these sizes should be given in the metric system. For active electrodes to be used with the positive pole the committee naturally selected platinum as the best, its one objection being its first cost. Where the applications are to be made to the surface of the body or to the interior of a cavity like the uterus, carbon is equally good, and for such purposes carbon beads can be threaded on platinum wire. Zinc is also a useful material for intra-uterine galvano-cauterization. It should be connected with the reophore by means of the standard binding post already mentioned. It was recommended that the conducting cords employed in electro-therapeutical work should be of the standard sizes and lengths used by the Bell Telephone Company.

For negative intra-uterine application a Simpson sound made a useful electrode, and its size should be stated according to the French scale. Where the surface of the electrode is necessarily very irregular, its area should be determined by ascertaining how much water it will displace. It will be well for manufacturers to stamp all electrodes with two numbers—one giving the French scale, and the other the displacement of water or the surface of the electrode.

The committee recommended that a standard insulating material be adopted,

and that the standard screw should be No. 240 of the American gauge.

All electrodes should be washed with soapsuds after each application, and boiled for five minutes before being used again.

Dr. Morton supplemented this report by presenting certain electrodes which he had devised, and which had proven useful in his practice. The first was a rubber covering for dispersing electrodes. It was an elastic rubber cap which would slip over the various sized electrodes, and which formed a pocket around the electrode, thus catching the water which would otherwise leak out on the patient's clothing. The second instrument was a new cataphoric electrode. With the usual form of this electrode it had been found impossible to apply the desired quantity of the medicated solution to the electrode without increasing the thickness of the blotting paper to such an extent that it interfered with and sometimes wholly prevents cataphoresis; for it is essential that the distance between metallic conduction and electrolytic conduction should be reduced to a minimum. To obviate this defect Dr. Morton had an electrode made in the form of a hollow box of hard rubber, the bottom of the box being formed by a piece of block tin perforated with numerous small holes. The box is filled with the desired quantity of the medicated solution, which passes through the small openings in the tin bottom and is fed to a thin piece of blotting paper on its lower surface. In this way any quantity of the solution may be employed without interfering in the slightest degree with its cataphoric action.

The third instrument exhibited was an Apostoli intra-uterine electrode insulated at the tip and at the cervical portion. In conclusion, the speaker referred to the advantages of punk as a covering for electrodes, and said his patients invariably found it the most agreeable covering of any employed. It had the great advantage of remaining moist for a long time.

Dr. G. Betton Massey, of Philadelphia, said that two years ago he devised an electrode made of a spiral of platinum wire enclosing a second spiral, the object of this construction being to facilitate rendering the instrument aseptic. A flat

coil of No. 20 wire was in his opinion a much better basis for an electrode than gauze. If the French scale were employed, he thought it should indicate the diameter and not the circumference of the instrument.

Dr. Franklin H. Martin, of Chicago, called attention to the fact that he was the first one to invent and exhibit a spiral electrode. His instrument was first brought to the notice of the profession in 1887.

Dr. J. B. Greene, of Indiana, preferred the English to the French scale. The best material he had ever used for an electrode was moistened woodpulp; it was an excellent conductor, and so cheap that it can be thrown away after use. In his opinion it would be impracticable to fix upon standard sizes for electrodes.

A communication was read from Dr. Lucy Hall Brown, of Brooklyn, in which she recommended a special electrode made of a perforated brass plate covered with punk and connected to the reophore by a peculiar spring clamp which she had devised.

*On Investigation of Dr. Newman's Statistics in Urethral Stricture.*—The committee, consisting of Drs. A. H. Goelet, Wm. J. Morton and W. J. Herdman, reported that they had made a very careful and conscientious examination of Dr. Newman's records and statistics and had asked, but unsuccessfully, for the co-operation of certain general surgeons. The committee unanimously agreed that Dr. Newman's statistics fully substantiated the claims he had made.

#### AFTERNOON SESSION.

Dr. Newman, of New York, read a paper on "Electrolysis in Tumors of the Bladder."

The author considered only cases of non-malignant tumors in the female bladder. If the bladder be very irritable the preparatory treatment should consist in the careful use of medicated injections, by which means a bladder which can hardly retain four ounces may be made to tolerate as much as twelve ounces of fluid. For the proper use of the cystoscope it is necessary to have from four to six ounces of fluid in the bladder. The cystoscope is first used to locate the

tumor, and the author advised that its use should be immediately followed by an examination with the endoscope. By means of the rubber ring slid on to the instrument it is easy to locate the distance of the tumor from the meatus. Indeed he had found comparatively little difficulty in subsequently cauterizing the exact spot desired. The constant current of a galvanic battery was invariably employed, and except where it was necessary to control hemorrhage, the negative pole was the one selected. The average current strength was 10 m. a.; each sitting lasted from five to fifteen minutes, and the intervals depended upon the result of each sitting and the condition of the patient.

There are two methods of electrolysis, general and local. General electrolysis has a specific absorbing and healing effect upon a tumor, and may be employed when the patient cannot tolerate other measures. Local electrolysis may be performed firstly, by means of a little bulb placed in contact with the tumor; secondly, by the introduction of a platinum needle and thirdly, by fixation of the tumor and the introduction of a platinum needle into the tumor. The fixation of the tumor may be accomplished with the help of an instrument called the vesicle tenaculum cache, and this instrument can be used as a guide to the introduction of the electrode. With this method a cannulated platinum needle is employed, which not only allows of the easy introduction of the needle, but it is so arranged that the needle is projected only a certain distance beyond the end of the cannula into the tumor—a distance which can be determined beforehand by the proper adjustment of the instrument.

All the operations were done through the urethra without the employment of anesthesia, the production of pain, or interference with the patient's occupation. The author did not wish to be understood as asserting that electrolysis would cure all benign tumors of the bladder, yet he claimed very satisfactory results in the cases which he had thought proper to subject to this treatment.

"The Nutritional Effects of Statical Electricity Considered in Relation to High Frequency and High Potential

Currents, and the Transparency of the Dielectric."

Dr. William J. Morton, of New York, read a paper with this title. Through the recent labors chiefly of D'Arsonval, Tesla and Elihu Thompson, statical electricity has assumed new and important relations to electro-therapeutics. In contradistinction to the low frequency of the current obtained from the ordinary faradic coil, the high frequency high potential current is simply a periodical current, or one in which the electrical energy is cut up into many waves or periods—ten thousand to ten million per second. With this high frequency there is a correspondingly high electromotive force, and it is mainly these factors and not electrolytic conduction which is the important point to be considered when studying the electro-therapeutic effects of this current.

When a Leyden jar is suspended in connection with any electrostatic machine and the spark caused to pass, every time the spark passes, there is a corresponding discharge in the Leyden jar, and with each discharge oscillations take place many thousands of times a second. This is the periodical current with which we are dealing in electro-statics. The oscillations are reduced in frequency in proportion to the resistance in the circuit.

The high frequency current seems to possess an unlimited power of penetrating tissues of the body. As the static machine is set in motion and a spark passes, every particle of ether in the room is also set in motion, and the same vibration is set up in our own bodies.

According to the modern view of electricity, the electrical energy which produces what we call the current is around the wire and not in the wire, and the electrical influence is felt in the medium around the wire. If this is not a conductor then these same ether vibrations impinging on the dielectric put it in a condition of strain. The dielectric is a non-conductor having a charge, and being in relation to another body also having a charge. It is found that these periodical currents are conveyed both by our conductors and our non-conductors, and in the technical language of the present time it is said that a dielectric is "transparent" to periodic currents.

The principal object of the paper was to present the results of a series of observations which the author has made at his clinic in the New York Post-Graduate Medical School. The secretions were affected. That the circulation is visibly affected is shown by the dilatation of the cutaneous vessels following immediately upon the application of sparks locally or generally. A series of tabulated cases were shown, showing that in a great number of cases under observation, the pulse was lowered by statical electrification from fifteen to twenty beats, and that the body temperature was usually increased from a half to one degree. Stating broadly, he thought he might deduce the law that the disposition of statical electrification is to produce an equalization by acting upon the centres—reducing a frequent pulse and elevating a subnormal temperature, or vice versa.

Observations were also presented which showed that in cases of chronic articular rheumatism this treatment resulted in greatly diminishing the quantity of uric acid and correspondingly increasing the quantity of urea. It was also noted that many patients while under this treatment gained in weight very perceptibly—one patient gaining forty-two pounds in five weeks.

The author concluded by expressing the conviction that statical electrification was only the beginning of a new and extremely important era in which the periodical current would play a prominent part, and lead to much better practical results. The very mechanism which the author was the first to describe, and which was published in 1881, is to-day found to be essential for producing these wonderful electro-static effects of alternating currents.

#### DISCUSSION.

Dr. H. E. Hayd, of Buffalo, said he could vouch for the statement that statical electricity profoundly affects the secretions, for he had frequently observed that it increased the specific gravity of the urine. He also knew from personal observation that it stimulated the circulation, and was especially useful in muscular rheumatism owing to its power of increasing the activity of the hepatic function. He could also confirm what

had been said about the increase in body weight and in the quantity of urea excreted.

Dr. Massey referred to a recent case in which the improved nutrition could only be attributed to the effect of the static charge.

Dr. Herdman said that the effect of statical electrization on the circulation was sufficient to explain many of the beneficial results mentioned. He believed that in spinal irritation, and in neurasthenia, the good effects of this treatment were directly attributable to its action in relieving the passive congestion which he considered to be the fundamental cause of these affections.

A few days ago Tesla admitted in his presence that his experiments with the high frequency current were the result of his attention being directed to the subject by Morton's description of his method of producing the static induced current.

Dr. Holford Walker, of Toronto, said that although his experience with statical electricity extended only over the past year, he had observed beneficial effects from its use which could only be explained by its action in increasing the circulation.

Dr. J. B. Greene, of Indiana, said that the author had not shown any marked change in the temperature as a result of statical electrization, although claiming a marked effect on the pulse; nor had he exhibited any sphygmographic tracing from these patients. This he considered a very serious omission. His own observations had led him to believe that the good effects observed after statical electrization were largely due to "suggestion."

Dr. W. B. Sprague, of Detroit, said that although using one of the small static machines which had been characterized as a "toy," he had obtained gratifying results with it in cases of neurasthenia.

Dr. P. S. Hayes, of Chicago, said that his experience with statical electrization during the past ten years justified him in endorsing what had been said in its favor.

Taking into account the high tension of statical electrolysis he believed that the current acted directly on the contents of the cells in the tissues, and not merely on the fluids surrounding the cells.

Dr. Margaret A. Cleaves, of New York, said that she had also observed a remarkable increase of body weight in many cases. She also called attention to one very practical point—viz: that constipation of many years standing is very commonly relieved by statical electricity applied over the lumbar and sacral plexes of nerves and to the abdominal parietes.

Dr. Morton, in closing the discussion, said that if "suggestion" were capable of uniformly affecting the pulse and temperature in the manner exhibited in his tables, it might well be adopted instead of electrical treatment. A rather intimate acquaintance with the subject of hypnotism had failed to convince him that it possessed any such remarkable power. A change of one degree uniformly in given cases he considered a "marked change."

A paper on "Electro-Medical Eccentricities" by H. Newman Lawrence, Esq., of London, Eng., in the absence of the author was read by the Secretary.

He first discussed a very common defect of many text books on electro-therapeutics, viz: the apparent lack of connection between the part which treats of electro-physics and that which treats of the therapeutical applications of electricity.

He next suggested that there should be a proper standard of qualifications for medical electricians, and that those so qualified, might with advantage carry out the electrical treatment of cases referred to them by general practitioners. The third topic which received attention, was the existence of so much quackery under the name of electricity or magnetism. The author thought the medical profession should no longer remain silent in regard to so called magnetic apparatus and appliances dependent for their action upon the well known process of electro-physics, and he suggested that the association appoint a committee to consider the best way of overcoming these abuses.

The paper was discussed by Dr. Morton and Dr. Herdmann; both of whom expressed the opinion that any attempt to overcome such outrages by legislation would produce the very opposite result to that which all desire. It was only by individual effort in the dissemination of correct popular information on medical

electricity that we could hope to defeat these quacks.

"The Action of the Continuous Current within Living Tissues as Distinguished from the Local Polar Action."

Dr. W. J. Herdman, of Ann Arbor, read a paper on this subject. Whenever a tissue is subjected to the action of a continuous current, owing to the fact that the tissue is made up of cells containing fluids and surrounded by cell walls having a greater resistance, these fluids must be absorbed. This is by a process of convection and not of conduction. This theoretical view that electricity must exert a systematic effect is confirmed by experiments made by the author and by others on healthy animal and vegetable tissues. It was found that when these tissues were exposed to a feeble current of electricity for a short time daily, their growth was decidedly increased, but it was retarded by a more prolonged action of the current.

#### DISCUSSION.

Dr. Massey said that the abdominal walls of many patients undergoing the Apostoli treatment for uterine fibroids became the seat of an increased deposit of fat owing to the improvement of the general health consequent upon the treatment.

Dr. Morton said that the experiments of G. Weiss, the physiologist in Paris, bore out the point made in the paper regarding electrolytic action and its effect on functional activity of the cells. This investigator passed a strong continuous current through one leg of a healthy frog. After a week it is found that the excitability of this leg was about ten times less than that of the other leg. The speaker said he believed in the polar effect, and believed it reached deeply. Acting on this purely physical view of the action of the electrical current in the human body, he had been in the habit of applying the positive pole to the spine for all spinal cord degenerations, and the negative pole for all inflammations. This was exactly the reverse of the usual treatment, but his experience with this method of treatment had only served to convince him that it was founded on a correct theory.

Dr. Herdman, in closing the discussion, said that although many electro-thera-

peutists did not believe at all in the intra polar action of the current, he not only believed in it, but considered it very important. By the term "convection" he had meant to convey the same idea as we represent in the expression "progression of the atoms."

"Observations on the treatment of Goitre."

Dr. Charles R. Dickson, of Toronto, read a paper with this title. He now uses Goelet's modification of Apostoli's clay pad, and begins with a current of 10 to 15 m. a. for ten minutes. The treatment is continued on alternate days and the strength of the current gradually increased up to 100 or 120 m. a., although in exceptional cases, over 200 m. a. may be used. He considers a strong current applied for a short time preferable to using a weak one for a long time. After the treatment the parts are sponged off with a cold solution of boracic-acid. If after several weeks of this external treatment there is no result, it is proper to resort to puncture. Strict antiseptic precautions are observed, and the puncture is made with a surgeon's needle insulated with several coats of collodion. The puncture should be made if possible, low down through the isthmus, and during the introduction of the needle the patient should be directed to swallow so that puncture of the larynx may be avoided. The subsequent punctures are all made at the same spot.

In the cystic form the external treatment is of little use. Here the author advises inserting an aspirating needle, drawing off the contents and filling the sac with a solution of salt in boiled water. The object of this is to make use of an electrode which will fill the deepest recesses of the sac. The aspiring needle is used as an electrode, and after the application the fluid is withdrawn.

In conclusion the author said that he still maintains that in electricity we have one of the most valuable agents in the treatment of all forms of goitre, and that it is the safest treatment. He had known even external applications of iodine to produce so much edema that death from asphyxia seemed imminent. Electrical treatment in exceptional cases may have to be extended over a period of two years.

## DISCUSSION.

Dr. Massey said that some years ago he had succeeded in absolutely curing a cystic goitre which had resisted other means. Four out of six cases of exophthalmic goitre he had completely cured by the external application of a current of 10 m. a.

Dr. Morton cited one case in which he had succeeded in reducing a very large goitre to one-third its original size by means of the faradic and galvanic currents used simultaneously by a combining switch.

Dr. Walker spoke of a case in which a lady received such prompt relief from electrical treatment that she would not continue it long enough for a cure to be effected, but preferred to return once each year and receive treatment for about three weeks.

Dr. Dickson said, that in one case where the goitre was large and distinctly fibrous, there was a protrusion of the right eye-ball which diminished in proportion as the goitre was reduced.

SECOND DAY—September 13th.

## MORNING SESSION.

Dr. Holford Walker, of Toronto, reported a "Case of Ascites Cured by Galvanism." The patient, a little boy, was treated by galvanism, thirty-nine applications being given. The positive pole was a large clay abdominal electrode, and the negative a large metal disc which was applied alternately to the shoulders and back every other day for fifteen minutes. The patient was unable to tolerate a current of more than 50 to 75 m.a. At the end of three weeks it was evident that the fluid was being absorbed, and in a month or two it entirely disappeared, and since then the patient has continued well except for a mild attack of rheumatism. Previous to resorting to electricity all the usual remedial measures had been tried, and had failed.

## DISCUSSION.

Dr. Newman cited from memory the case of a man with extensive anasarca and ascites, who was brought to him after a number of consulting physicians had expressed the opinion that in spite of

treatment he could not live more than two days. Not more than this time elapsed before he measured three inches less than before the electrical treatment was begun, and he ultimately recovered entirely. The speaker could not recall the original diagnosis recorded in his case-book. He thought that the treatment caused the withdrawal of some of the fluid, and that it stimulated the secretions.

Dr. Engleman cited a case of ascites, seemingly just as severe, where two very able physicians gave a similar prognosis. At this juncture, some of the patient's family insisted upon calling in a quack whose treatment consisted in making certain "passes" about the patient. One of the regular physicians continued to call in order to watch the treatment. The patient immediately began to improve, and during the ten years which had elapsed since then, she has remained entirely well. In that case, microscopical and chemical examinations of the urine confirmed the diagnosis of renal disease which had been made by the physicians originally in charge of the case.

Dr. Eugene C. Gehring, of St. Louis, thought that an ascites associated with kidney disease was due largely to spasmodic irritation, and that a cure was brought about by the relaxing effect of the electricity on the nervous system.

Dr. J. B. Greene, of Indiana, said, that he had been called in consultation a few months ago to a similar case where the diagnosis of renal disease was substantiated by the results of the microscopical and chemical examination of the urine; yet to his surprise the attending physician afterwards informed him that from the time galvanism was begun the patient began to improve, and eventually recovered.

Dr. Walker, in closing the discussion, said, that the diagnosis in his case had never been clear. As the boy had been standing daily immersed in water up to his waist, it was possible that the ascites was the result of ordinary subacute peritonitis, or of tubercular peritonitis, as there was a history of tuberculosis on the maternal side. The kidneys were perfectly healthy.

"Metallic Electrolysis."

Dr. Margaret A. Cleaves, of New

York, read a paper on this subject. By this term was meant treatment by inserting in the natural cavities and in the tissues soluble metallic electrodes, such as those made of copper, zinc and iron. Experiments were cited which proved not only that an oxychloride of copper was deposited in the tissues, but that subcutaneous injections of comparatively large quantities of this deposited salt failed to produce in rabbits any toxic symptoms. Other experiments indicated that this copper salt had a more powerful bactericidal action than the ordinary galvano-caustic applications, and that by the cataphoric action of the current, the deposited metallic salt is made to penetrate deeply into the tissues. This is a convenient method of applying a metallic salt in the very depths of the most tortuous sinuses, and it should not be forgotten that the salt so deposited, being in the nascent state, is peculiarly active.

The author stated that for intra-uterine work, a current of 25 to 50 m.a. is sufficient when given for fifteen minutes, and that then a reversed current of 10 or 15 m.a. should be given for six or eight minutes in order to loosen the electrode. However, it should be noted that this adherence of the electrode to the tissues may be avoided by gentle and continued manipulation in suitable localities during the application of the current. Too frequent applications are liable to retard the progress of the case. The work of elimination and repair which takes place in the neighboring tissues without pain and without inflammatory reaction, extended over a period of eight days. Metallic electrolysis has proved extremely efficient in controlling uterine hemorrhage. The electrodes should be carefully rubbed with emery paper after each application.

Cases were also cited in which the author used metallic electrolysis successfully in uterine fibroma, endometritis, urethritis, granular degeneration of the cervix, hypertrophic rhinitis, trachoma and hemorrhoids. Improvement was observed in most of these cases after one or two sittings, and the cure was both speedy and permanent.

An especial set of electrodes for application to the conjunctival membrane were presented by the reader of the

paper, as well as needles for puncture.

#### DISCUSSION.

Dr. Morton said, he had proposed the name "metallic electrolysis" instead of "interstitial electrolysis," as used by Gautier, because interstitial electrolysis may occur anywhere where there is a powerful continuous current, even though the electrodes are not metallic. He had been surprised to find in a book written by Butler, in 1876, a very good description of a similar method of treatment, but without any reference to its application in gynecology.

Dr. Morton then exhibited special forms of electrodes which had been found useful in applying this treatment to the nose, uterus, urethra and rectum. The adhesion of the electrode to the tissues is particularly noticeable in the treatment of urethritis, and it is probably due to the formation of a soluble albuminate of the metal constituting the electrode. The speaker then cited a case in which he had promptly cured a gonorrhea of three months' standing, and also the treatment of a cyst on the side of the neck. He also described the action of metallic electrolysis in curing hemorrhoids and atrophic rhinitis, the cure in the latter condition, he thought, being probable due to a restoration of the activity of the few glands which have escaped the destructive process.

Dr. Hayd objected to the treatment from theoretical considerations. He thought it was unduly magnifying the local action of the current, and at the same time encouraging the already too prevalent practice of employing intra-uterine treatment.

Dr. Massey said, that the objections made by the last speaker did not apply to the *expert* use of intra-uterine applications. We have metallic electrolysis every time we use the galvanic current unless the patient be protected by a very large clay pad to catch the particles of metal which pass off from the metallic conductor. As regards this mode of treatment in connection with hemorrhoids, he wish to state that he had applied a current of 40 or 50 m.a. with a carbon electrode to hemorrhoids, and had seen them reduced by this means, so that it could not be said that metallic elec-

trolvysis is essential for such reduction.

Dr. Green also objected to this indiscriminate probing of the uterus as unwise and unsafe. He had quickly cured one case of hydrocele by galvano-puncture of the sac with a zinc needle, without withdrawal of the fluid. There had been no relapse.

Dr. P. S. Hayes said that while admitting the dangers likely to follow upon the employment of intra-uterine galvanic treatment in improperly selected cases, he felt that in suitable ones the expert operator could accomplish his purpose much more safely than by the usual topical applications of medicines. It was important to remember that without due regard to the proper technique of metallic electrolysis, it was an easy matter to produce a trauma as a result of the agglutination of the electrode to the tissues. The speaker also emphasized the peculiar powers possessed by metallic electrolysis by virtue of the metallic salts being in the nascent state, and the current carrying them deeply into the tissues. It is probably because of this penetrating action that it has been found so useful in the treatment of gonorrhœa.

Dr. Gehrung remarked that this cataphoric action of the current carried along one portion of the medicament before another particle was presented to the tissues, thus preventing a clogging up of the spaces with the medicine.

The President said that he was the first to call attention to the uterine colic excited by cupric electrolysis. Further investigation convinced him that the astringent action of the application tended to constrict the canal and obstruct drainage, and some of the gas which was evolved during the electrolysis did not combine with the metal of the electrode but remained free in the cavity. By securing better drainage from the cavity by means of previous dilatation, cases which had before suffered with colic, were able to receive the treatment with entire freedom from this unpleasant complication. He knew of nothing superior to cupric electrolysis for controlling the most severe forms of uterine hemorrhage, but for endometritis and granular degeneration of the cervix, he preferred zinc

electrolysis. Zinc electrolysis was also useful in promoting the healing and obliteration of the sac of suppurating vulvo-vaginal glands after incision and evacuation of the contents. He had also treated successfully by zinc electrolysis a large keloid involving the anterior surface of the thigh, using 5 m. a. for each zinc needle, for ten minutes, about ten or twelve applications being required. He had employed zinc electrolysis also in one case of fibroid by means of vaginal puncture and had noted that it produced decided softening and marked diminution in the size of the growth.

Dr. Cleaves, in closing the discussion, said that while she believed a great deal of intra-uterine treatment is unnecessary she was satisfied that in certain cases the results from such treatment were quicker and more lasting than from any other. In her own practice, she did not exceed a current of 30 m. a. and oftener used a less current strength.

#### "Some Observations on the Fine Wire Coil or Current of Tension."

Dr. H. E. Hayd, of Buffalo, read a paper on this subject. He said that his own induction coil consists of 3500 feet of No. 32 wire, tapped at three points, so as to permit of using lengths of 1500, 2500 and 3500 feet respectively. He had been informed that the vibrator made from 250 to 350 vibrations per second. In securing a sedative action from such a coil, it is very important that the action of the vibrator should be both rapid and smooth. The current from the fine coil may be considered a specific in the relief of that form of neuralgic dysmenorrhea characterized by tenderness over the ovaries, marked epigastric tenderness, nausea and vomiting. The treatment is safe and painless, and the current is best administered by means of a simple bipolar vaginal electrode. These conclusions were supported by a number of illustrative cases.

#### DISCUSSION.

Dr. A. Lapthorn Smith, of Montreal, said that at least half a dozen cases which had not been relieved by laparotomy and the removal of the appendages had come to him subsequently, and had been completely relieved of all symptoms by the use of the fine wire current.

Dr. Engleman said that very vague notions prevail regarding the speed of the ordinary interruptors on induction coils. If the author had used a speed of 350 vibrations per second, the patient would not have felt the current. The average vibrator he had found by actual experiment made from 2000 to 2400 vibrations per minute, and the best of the old kind of vibrators which he had been able to find in the market—that of Gaiffe, only vibrated 3000 times per minute, or fifty per second.

(At this point the discussion was interrupted in order that it might form a part of the formal discussion on this subject which had been arranged to take place in the afternoon.)

#### AFTERNOON SESSION.

##### DISCUSSION.

"The Influence of Frequency of Interruptions and Character of Induced Current Waves upon the Physiological Effect."

Dr. William James Morton, of New York, opened the discussion. He said we possessed three mechanisms for exciting induced currents, viz: (1) the induction coil; (2) dynamo-electric machines; and (3) condensers—Leyden jars, etc. It has been found that the current with long periods will kill instantaneously while one with short periods is harmless. The speaker said that in April, 1881, the *New York Medical Record* published an article in which he described a new induced current obtained from the static machine. His conclusions were: That the current possessed great diffuseness; that it produced an analgesic effect; (3) that it produced a vaso-motor effect, manifested by dilatation of the superficial blood vessels and the occurrence of perspiration; and (4) that it caused an elevation of the body temperature. His mechanism, then published, is the fundamental electrical mechanism necessary to produce the high frequency high potential currents now so thoroughly familiarized by the labors of Tesla, Elihu Thompson and D'Arsonval.

In February, 1891, Tesla published his first article on high frequency cur-

rents. In this article he made the statement that the writer's experiences tend to show that the higher the frequency the greater the amount of electrical energy which may be passed through the body without serious discomfort.

About the same time Elihu Thompson was investigating the same subject. He found: (1) that the higher the frequency the less the effect on an animal; (2) that the cause of pain lies chiefly in the muscular contractions produced; (3) that the cutaneous nerves were less painfully affected at a higher rate; (4) that the visual mechanism was not excited at a higher rate, even with a pressure of fifteen volts.

D'Arsonval's conclusions were: (1) That the high frequency current had no effect on the organs of feeling; (2) that it produced no muscular contractions; (3) that there was a diminution of the sensation of pain; (4) that there was a dilatation of the blood vessels; (5) that it caused an increased perspiration; (6) that it caused increased tissue change, manifested by increased absorption of oxygen and increased elimination of carbolic acid; and (7) that it caused no increase of body temperature.

Dr. Morton then exhibited a medical induction alternator affording sinusoidal current, which Mr. A. E. Kennelly had constructed at his suggestion. It gave a current having 1200 periods per second.

The discussion was continued by a communication from A. E. Kennelly, Esq. of the Edison Laboratory, entitled "Induction Coils."

In his absence, the paper was read by Mr. E. M. Smiles. The author began by giving a strictly technical description of the magnetic laws involved in the working of induction coils. Observation shows that the primary current does not instantly reach its full value, but there is developed in the primary coil an electro-motive force which is always in opposition to that of the battery. This is called self-induction. As soon as the vibrator spring leaves the contact point, the metallic circuit is broken, but not instantly, for there is induced a secondary flux in both the primary and secondary coil, and in such a direction as to sustain the battery current. The duty

of the faradic coil is to supply a certain strength of alternating current at a given frequency. Probably no two coils give precisely the same wave characters; long coils and many windings produce smoother flowing and less abrupt waves. The ordinary form of spring vibrator rarely supplies more than 250 vibrations per second, while the ribbon spring easily makes 1000 vibrations per second; but both are very irregular. If a current of 5 m. a. be supplied by an ordinary faradic coil at 250 alternations, there will be much uncertainty as to the wave characters, but if the primary be excited by a sinusoidal current of the same frequency, the character of the waves can be accurately determined.

A communication from professor Edwin Houston, of Philadelphia, entitled "Remarks upon Apparatus to produce Induction Currents, and the Character of the Waves of Individual Apparatus, with Especial Reference to Those Applicable to Medical Uses," was read by Dr. Morton in the absence of the author.

Reference was made to the remarkable change in the physiological effect which resulted from a change in the frequency of the interruptions of the current. The harmlessness of the high frequency current is probably due to the fact that it is unable to reach the deeper organs; for, if the effect of the discharge on a bar of solid copper is very superficial, the effect on the human body must be still more superficial.

Dr. J. H. Kellogg, of Battle Creek, continued the discussion in an article entitled "The Graphic Study of Electrical Currents in Relation to Therapeutics."

Dr. Kellogg said that he thought thus far in the discussion two or three different forms of current had been confounded, for the rapidly interrupted current is not a sinusoidal current. He first described this current in a paper read before the American Medical Association in 1888. The effects obtained from it varied with the speed of the machine. When only fifteen or twenty alternations were made per second, it produced vigorous muscular contractions with complete relaxation at each alternation. The sensory effects

are best obtained by giving the machine a high velocity; under such circumstances, it will be found that if the electrode be placed in the region of the eye, the subject will perceive a luminous field which varies its position with that of the electrode.

He had made more than twenty thousand applications of the sinusoidal current, the greater number being in gynecological cases; and with it he had been enabled to cure hundreds of women who had previously suffered many things at the hands of gynecologists. The current is chiefly useful: (1) In exercising muscles which are not easily brought into action by voluntary effort; (2) for producing muscular contraction in cases where degenerative changes have advanced so far that the muscles fail to respond to the faradic current; (3) in connection with "the rest cure" for giving exercise to feeble patients. Here it is superior to the faradic current on account of the painlessness of the contractions and their greater vigor. The application is also more easily made as it is not necessary in most cases to locate accurately the motor points. (4) It is very valuable when used alternately with massage. (5) It is of the greatest advantage in strengthening relaxed abdominal muscles, which are often responsible for displacements of various abdominal viscera, and the occurrence of various reflex symptoms. (6) For the treatment of hyperesthetic conditions of the nervous system. Here it is necessary to employ an extremely delicate rheostat, and to use the current obtained from the machine while at a high speed. In marked contrast with the faradic current, he had found no idiosyncrasy to the sinusoidal current.

He believed the rheotome was a fatal element of weakness in the induction coil, and that this well known instrument is inherently faulty as an agent in electro-therapeutics. Nothing but the graphic method would enable the medical practitioner to regulate a faradic apparatus so as to obtain exactly the same current at all times, and he predicted that the faradic apparatus would have to give place to a more reliable instrument.

THIRD DAY.—September 14th.

MORNING SESSION.

(*Discussion of yesterday concluded.*)

H. Newman Lawrence, Esq., M.I.E.E., of London, England, sent a contribution to the discussion, entitled, "In Medical Induction Coils, how does the Current of the Primary differ from that of the Secondary; and what Influence has this Difference upon the Respective Physiological Effects?"

The charging current can be measured both as to voltage and amperage; the secondary current is the source of alternating impulses, and dependent for voltage and amperage upon the number of turns around the primary, the strength of the charging current, and the rate of interruption of the vibrator. Muscular contraction may be produced by an infinitesimal amperage, provided it be sufficiently concentrated. In general, therefore, when muscular contraction is required, the primary current is the more painful to use, but owing to its other properties it may be found in certain cases less painful when applied to the nerves.

The discussion was continued by the reading of a communication from Dr. William F. Hutchinson, of Providence, R. I., entitled, "A Study of Electrical-Anesthesia and Frequency of Induction Vibration." This paper was supplementary to one on the same subject read at the last meeting of the association. By means of Cook's reed-pipe, the author had been able to more accurately determine the number of vibrations. He now believed that the cause of electrical-anesthesia must be looked for in that principle of mechanics known as the superposition of small motions. In a vibrating wire it is found that there is a "dead point" or spot at which the wire is at rest. Replacing the reflected wave on the wire by an efferent impulse along the nerve, we can imagine that electrical-anesthesia is due to the formation of a similar "dead point" along the nerve. Just as many vibrations must be imparted to a sensory nerve inwardly as are proceeding outwardly upon it in order that a dead point or zone of anesthesia be created. The rate of the electric wave

and that of the nerve impulse seem to be identical, and hence, pain is the mechanical expression of disturbed energy, and it is to be destroyed temporarily by such vibratory action as will restore rest to the nerve. The writer admits, however, his inability to explain why it is that the anesthesia should be confined to an area not much greater than the electrode, although it is easy to demonstrate that the current traverses the whole length of a nerve.

The President here took part in the discussion, making some remarks "On the Influence of Frequency and the Graphic Curve on the Results of Gynecological Electro-Therapeutics, particularly with the Sinusoidal Current."

His conclusions were based upon observations made with the faradic current and an apparatus constructed for him by the Kidder Manufacturing Co., consisting of an alternator run by a motor, by which an alternating current, having 800 alternations per second, could be sent through the primary coil of his induction apparatus. With five Leclanché cells in the primary, the current obtained in this manner and with this, this number of alternations was almost imperceptible to the hand, but he noted that it was appreciable in the vagina. It had a marked soothing effect on the patients upon whom he had tested it. He claimed to be able to cure endometritis with the alternating current or the interrupted induced current as obtained from the improved faradic apparatus he had devised. The way in which it accomplished this was, in his opinion, by its influence upon the vaso-motor supply in relieving pelvic congestion which is often the primary cause of the trouble. Where the canal is not patent, free drainage was secured by occasional negative galvanic applications of very moderate strength.

He believed with Mr. Bland Sutton, that in the great majority of cases of salpingitis the obstruction in the tube is due to tumefaction of the mucous membrane, and if this can be removed, as is often possible, by means of a proper application of the current, it is an easy matter to secure natural drainage of the tubes through the uterine cavity.

One very noticeable effect of this current was a very decided improvement in

the systemic condition even when it was applied to the pelvic organs.

(The discussion was here interrupted to allow Dr. Kellogg and Dr. Morton to demonstrate the properties of the alternating current as obtained from their machines.)

Dr. A. Lapthorn Smith then resumed the discussion. He said that the same increase in weight which is observed after the application of the sinusoidal current results from ordinary exercise. Referring to the fineness of the interruptions, he said that an excellent vibrator for this purpose could be made out of a piece of ferrotype metal. He had been able to obtain with the fine wire faradic current all that Apostoli claimed for the sinusoidal current. The improvement in the circulation was principally due to the muscular contractions produced by the current.

#### The Alternating Current in Electro-Therapeutics.

Drs. Georges Gautier and A. Larat, of Paris, France, sent a paper with this title. It was translated and read in abstract by Dr. A. Lapthorn Smith.

The paper stated that the faradic current attained its maximum quite suddenly, whereas the sinusoidal current reaches its maximum much more gradually, and consequently a larger dose can be borne. They claimed that any current having oscillations not over 20,000 per minute is a sinusoidal current, and that the action of the sinusoidal current, even when muscular movements are absent, is to increase the absorption of oxygen and the elimination of carbonic acid and urea. One curious point noted was, that if after a person has eaten asparagus, he be subjected to the action of the sinusoidal current, the asparagus will not impart its peculiar odor to that person's urine. They claim that the current is useful in reducing obesity, and in treating certain forms of eczema and vitiligo, and that it is peculiarly efficient in the treatment of infantile and pseudo hypertrophic paralysis. They recommend that the current be applied through electrodes hanging over the edge of a porcelain bath, and they added that for the sake of propriety it is desirable that the water of the bath should be rendered opaque by the addition of starch.

Dr. Herdman said he had had very little personal experience with the high frequency currents, but he had been using for the past three years the Thompson Houston dynamo current, giving ten thousand alternations per minute. It was an agreeable current, but exerted a peculiar tonic effect on the vaso-motor system. We must admit that vibrations producing musical tones have some special physiological effects, but remarkable results are obtained with vibrations extending even beyond the limits of such tones.

Dr. George J Engleman, of St. Louis, thought in this discussion the faradic current had been treated in a pitiable way. The objections which had been made against it were those which applied to the old-time instruments, and which he had overcome by his separate vibrator and interruptor. Determining the number of the vibrations by musical notes is not only time-consuming, but is necessarily inaccurate on account of the large personal equation which it involves. He had gone still further with his investigations, and had shown that in addition to the improvements already mentioned, special coils must be constructed for certain definite effects. He had no experience with the sinusoidal current, but from what he had seen and heard from those who had introduced it he had not been tempted to experiment with it.

Dr. Morton, in closing the discussion, said that he thought the criticisms of the preceding speaker admitted the objections which had been made upon the unreliability and limited efficiency of the faradic coil as ordinarily constructed.

He had been much puzzled by Dr. Hutchinson's paper, for if he understood it correctly, we were asked to assume that the vibrations of an electric current, which are given at 540 per second interfere with the vibrations of a nerve impulse, which are about 11 to 19 per second. Although he admitted the power of the current to produce certain analgesic and subjective effects, he did not believe it could produce true anesthesia, and he could not but deprecate the fact that at neither the last meeting nor the present one, had Dr. Hutchinson demonstrated his method of producing electrical-anesthesia.

"The treatment of Dysmenorrhea by the Galvanic Current."

Dr. A. Lapthorn Smith, of Montreal, read a paper on this subject, in which he took the ground that dysmenorrhea is very commonly due to endometritis, rather than to stenosis of the canal. Thus, many cases are not at all relieved by rapid dilatation of the canal unless this procedure is followed by curetting or the application of iodine. From theoretical considerations he had been inclined to believe at first that the method of intrauterine galvanization which he advocated for the relief of dysmenorrhea, would result in sterility, but further experience has shown this not to be true. Apostoli quotes thirty cases in which pregnancy followed such applications. This important theoretical objection being disposed of, he felt free to urge the adoption of this treatment, as the mild currents employed, rendered it both safe and painless. If the uterus be large and the menstrual flow profuse, he would use the positive pole in the uterus; but if the uterus were poorly developed and the flow scanty, then he would prefer negative pole.

After a careful bimanual examination has excluded pregnancy, and has enabled the operator to form a correct idea of the condition of the pelvic organs the vagina should be disinfected with a douche, and a large Simpson sound, curved to correspond with that of the uterine canal, is passed through the flame of an alcohol lamp, cooled, and insulated with rubber tubing to within about  $2\frac{1}{2}$  inches of its tip. Under the guidance of the finger it is then gently passed into the canal until an obstruction is met with, when a current of about 10 m. a. is turned on. The instrument soon passes on, and after a current of from 20 to 50 m. a. has been allowed to flow for about five minutes, it is gradually reduced and turned off. The sound will then usually almost drop out of itself. A boroglyceride tampon is then inserted in the vagina, and the patient allowed to go home. No precautions, such as resting in bed, are considered necessary, and as a rule, the patient only received the treatment twice a week for from three to six weeks, when the second period will usually come on without pain. When the intra-

uterine electrode is connected with the negative pole, the positive pole consists of a clay abdominal electrode. Where the positive pole is made the active one, this pole must be of platinum, carbon or zinc.

#### DISCUSSION.

Dr. Massey said he could endorse all that the author had said about the simplicity and safety of this treatment. He rarely saw atresia except after the use of very strong currents, or where the operator had neglected to insulate the cervical portion of the electrode. For this purpose he preferred shellac to a rubber tube.

Dr. W. B. Sprague, of Detroit, said he had very rarely failed to relieve dysmenorrhea by intra-uterine application of electricity. He preferred to use the negative pole with a current of moderate strength, and so far from producing atresia, he had relieved such as already existed. In this class of cases, he never used currents stronger than 15 m. a., and he was inclined to believe that the menstrual pain is due to hypersensitivity of the nerves rather than to endometritis; for he had relieved the condition by currents so mild that they could hardly be expected to cure an endometritis.

Dr. P. S. Hayes, of Chicago, said he wished to be placed on record as fully endorsing the claims made in the paper.

Dr. Margaret A. Cleaves, of New York said that after an experience of six or seven years, she could corroborate what had been said in the paper. She thought the dysmenorrhea was quite as often due to pelvic congestion as to endometritis, and that this explained why it was relieved by such mild currents. A number of her patients had become pregnant within a few months and she did not believe that intra-uterine galvanization caused sterility after the treatment. She greatly preferred leaving an interval of from five to seven days between the treatments.

Dr. Kellogg had found that although there was no stenosis of the canal, many cases of dysmenorrhea are associated with vegetations which he believes swell up at the menstrual period, and so produce a temporary obstruction. At any rate such cases readily yield to applications

of 10 to 20 m.a., usually with the positive pole in the uterus. Where the trouble seems to be due to simple hyperesthesia, he had found the positive pole especially effective. His experience was entirely opposed to the idea that the treatment prevented pregnancy.

Dr. C. R. Dickson believed with Dr. Cleaves that dysmenorrhea is very frequently due to simple pelvic congestion. He was glad to see that operating surgeons were showing a greater disposition than formerly to refer these cases to those who make a specialty of electro-therapeutics.

Dr. Franklin H. Martin sounded a note of warning against recommending such intra-uterine treatment too freely to the general profession. The initial step should be the making of an accurate diagnosis. If the dysmenorrhea were due to non-development of the uterus, the faradic current of slow vibration would be much more appropriate than the galvanic; if, on the other hand, it were due to tubal or ovarian disease, the galvanic treatment would result disastrously. Where dysmenorrhea is due to endometritis or stenosis of the canal, positive galvanisms to the interior of the body of the uterus only was indicated.

Dr. Walker said that when the pain was most marked two or three days previous to the appearance of the flow, he was always very suspicious of the existence of disease of the appendages, and therefore would not resort the galvanic treatment until a careful examination under chloroform had excluded such a condition.

Dr. Smith, in closing the discussion, said that he had taken it for granted that an accurate diagnosis was a pre-requisite to safe and successful treatment. Believing as he did, that in the majority of cases dysmenorrhea is due to reflex spasm of the fibres of the internal os, brought about by an endometritis, he preferred to apply a mild current *directly* to the internal os.

#### AFTERNOON SESSION.

"The Treatment of Subinvolution by Electricity."

Dr. Charles G. Cannady, of Roanoke, Va., read a paper with this title. The author believed that the greatest benefit

is to be obtained in the shortest time from the use of electricity. He recommended for restoring the tone of the uterus that a current of 30 m. a. be applied to the interior of the uterus for ten minutes at a time, and that this be followed by the application of the faradic current from an Engleman coil of 600 meters, using a bipolar vaginal electrode. He thought the free use of ergot during labor predisposed to subinvolution, and, therefore, when this drug had been used in this way, he favored as a routine measure, the daily application to the uterus of the faradic current.

#### DISCUSSION.

Dr. Hayes thought no agent superior to electricity for re-awakening the retrograde physiological process necessary to complete involution, but he preferred the galvanic to the faradic current. He more commonly employed the positive pole, as there is ordinarily a condition of undue moisture present.

Dr. Sprague did not think it made much difference whether the galvanic or the faradic current was employed, but to obtain the best results, the applications should be made on alternate days.

Dr. Massey used the faradic current chiefly in cases which had not existed for more than six months; for the more chronic forms, he preferred galvanism. He believed subinvolution to be due to microbic infection of the uterus at the puerperal period, and if the infection be due to the gonorrhreal germ, the case will prove most obstinate to treatment.

Dr. Smith also thought that septic infection was chiefly responsible for subinvolution. He corroborated what had been said about the value of the continuous current.

Dr. Cannaday, in closing the discussion, said that where subinvolution had lasted for a year or more, the congestion had in large measure subsided, and, therefore, greater benefit was likely to follow negative galvanization.

"A New Intra-Uterine Electrode."

Dr. Plym. S. Hayes, of Chicago, exhibited an intra-uterine electrode made of a platinum spiral with a stilette in its centre. The objection of this special construction was to furnish an instrument which would allow of the free escape

from the uterus of the gas evolved during the Apostoli treatment. He had found that by attention to this detail in the treatment, much of the after pain could be avoided.

#### DISCUSSION.

Dr. Eug. C. Gehrung, of St. Louis, said that when he first employed the Apostoli treatment by galvano-puncture, he found that the gas accumulated in the tumors, and formed the basis of future abscesses; so he had constructed an electrolytic trocar and cannula, which was described and illustrated in Dr. Massey's book. It was found that the gas and fluids sometimes escaped from the tube for days after the treatment.

Dr. Massey said he had observed enormous quantities of gas escape from the cannula, but he thought most of the irritation observed after the treatment was due to the use of inflexible instruments.

Dr. Dickson thought that the tip of the instrument should be protected, and that any such spiral instrument was objectionable on account of the trauma likely to be produced during its introduction and withdrawal.

Dr. Hayes replied that there was not in reality so much difficulty in introducing and withdrawing the instrument as one would suppose who had not tried it. The evolution of gas is so great when strong currents are employed, that it prevents in a measure the adherence of the tissues to the electrode.

"A Contribution to Electro-Therapeutics in Salpingitis."

Dr. W. B. Sprague, of Detroit, read a paper on this subject. The paper contained the histories of several cases of salpingitis, in which the author had been able to introduce an electrode through the uterus and into the Fallopian tubes at a time when these tubes were distended with pus. In each case, there was a free discharge of pus and prompt relief to the symptoms. Of course, in many cases, he found it impracticable to carry out intra-tubal galvanization, but he had succeeded in other cases besides those reported in the paper, and in no instance had serious symptoms followed the treatment. His experience with this method extended over a period of three years. The treatment is necessarily of limited application, but is still extremely

useful in appropriate cases. He used a sound with a curve slightly sharper than the normal one, and was of course careful not to use any force. If after the instrument has reached the cornu of the uterus, a mild current be turned on, it will be found usually that in proper cases the instrument will soon pass on into the tube.

#### DISCUSSION.

Dr. Smith said that many would not believe it was possible to catheterize the tubes, but when in Liverpool, Dr. Wallace had shown him no less than six cases in his hospital at one time, in which the uterine sound had been passed into the Fallopian tubes.

Dr. M. S. Weber, of Detroit, referred to the sneering, doubting manner in which the first communication of the author on this subject had been received by the Michigan State Society, but he felt sure from what he had seen of Dr. Sprague's work, that he was to be congratulated upon what he had accomplished.

Dr. Massey said that in 1880, he brought up this subject before the Philadelphia Obstetrical Society. At that time, he had succeeded in emptying a number of tubes through the uterus. It should be remembered, however, that this was work suitable only for experts.

Dr. Sarah H. Stevenson, of Chicago, said that she had long been convinced that such treatment was feasible, but had hitherto lacked the courage to try it.

*(To be continued in next number.)*

### Note.

#### NERVOUS EXCITABILITY AFTER DEATH.

Experiments made by M. d'Arsonval with an instrument which he calls the myophone proves, contrary to the older opinion, that nervous excitability may exist for many hours after death. The old test of the muscle shortening is, no doubt, not applicable long after life has departed; but as the sound given out by the myophone proves the death of a nerve is much less rapid than has been hitherto supposed, and a nerve may act on muscle, in a state of electric excitability, without producing more than simple molecular vibration.

# The Times and Register.

A Weekly Journal of Medicine and Surgery.

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**PHILADELPHIA, NOVEMBER 11, 1893.**

## THE ADVANCE OF ELECTRICITY IN MEDICINE AND SURGERY.

If we should look back two decades and observe the crude state of electrical appliances, and, again look at the present apparatus for administering electricity we are led to wonder what the future will bring forth. If one has been to the World's Fair, and observed the wonderful display in the Electricity Building, he is inclined to exclaim, what

next! But the results obtained in medicine and surgery from the use of the electric current far exceed our expectations. It has long since out grown its narrow confines in application to simply neurotic diseases. It is one of the reliable therapeutic agents of the gynecologist, the surgeon and the physician; in fact, almost every special branch of medicine finds the electric battery among its remedial appliances.

There seems to be no limit to its power, and, yet it is a force which may be easily controlled.

It may be made an agent to destroy life, and, again it may act only as a pleasant and valuable stimulant to life, and all by the turn of a thumb-screw. That such a force should be thoroughly studied by the progressive physician is self evident. We regret that so few medical colleges have an adequate course on this branch of medical science. In fact it is but recently that Tufts College, in Boston; made the first step of any school toward establishing a special chair for instruction in electro-therapeutics, and it is to be deplored that her excellent instructor was snatched away by an untimely death.

We have recently learned through the efforts of the ever progressive Frenchman, by some hopeful demonstrations, that we may soon expect electricity to be counted as an efficient germicide. If this can be safely and effectually applied to destroy the germs of tuberculosis, what a boon it will be to mankind.

The relationship between atmospheric conditions with their effects upon disease especially the epidemic maladies have long been studied but it is not until recently that any stress was laid upon electric storms as being efficient agents to rid the atmosphere of disease germs. We trust we may learn that there is value in these theories. F. S. P.

## Annotations.

### RESUSCITATION IN ASPHYXIA, OR, LE PROCEDE DE LA LANGUE, OF LABORDE.

SOMETHING more than a year ago the eminent author and surgical teacher M. Laborde, of Paris, devised a new method of resuscitation after asphyxia from any cause. Before he submitted it to the profession he first made several observations on the human being, which he elaborated more fully, afterwards, on the lower animals.

He designated the scheme *Le Procédé de la langue*, or resuscitation by manipulation of the tongue.

His success with it, and also that of others, tend to prove that it is the simplest and most efficient of all known methods.

Briefly, it consists in opening wide the mouth, seizing the tongue with a forceps and making rhythmical traction on it. Each time the tongue is brought out through the mouth pressure is made on the thorax, in other words, it is practically an accessory to other relief measures.

As the method is simple, and appears to possess very great value, it is hoped that in America it will soon come in vogue.

In the Bulletin of the Academy of Medicine for September 1893, Dr. Vigneau, of Salies de Bearn, reports a most interesting case in which he appears to have actually restored to life a dead body with this method (asphyxia tetanique). His patient was a young woman, 19 years old, who was seized with violent eclampsia two hours after labor. Several physicians were simultaneously summoned. The patient had extreme oedema of the limbs, and the attacks, in spite of heroic medication, succeeded each other with terrible violence. Vigneau freely bled her but to no avail. At this juncture three other physicians arrived; the pulse ceased to beat, breathing stopped and the patient was apparently dead. Seeing that all was over the priest and doctors left, but Dr. Vigneau lingered. He thought of Laborde's method of resuscitation, called for a needle and thread, as he had no forceps with him, pried

open the mouth, pushed the needle through the tongue and secured a loop of the thread. Now he commenced rhythmical traction on the tongue with one hand while with the other he continued interrupted pressure on the thorax.

This he continued for fifteen minutes when the patient gave a sigh gasp; these were followed by regular respirations and a return of the pulse. This young woman made a rapid and complete recovery.—T. H. M.

### SALIPYRIN.

**I**N the *Ohio Medical Journal* for October, Dr. H. R. Bigelow, of Philadelphia, reports a case of amenorrhea cured by the use of salipyrin—fifteen grains three times a day were ordered. He attributes the result to the effect of salipyrin in repairing wasted nerve energy by restoring the nutritive power of the blood.

### HYPNOTISM IN RUSSIA.

**U**Ntil recently hypnotism has been interdicted in Russia by imperial decree. Lately this has been revoked, and the Minister of the Interior permits its practice and authorizes its rehabilitation under the following conditions: A physician may hypnotize his patient by strictly observing article 145 of the penal code. He must notify the proper civil authorities of the application of the treatment, who will designate certain other physicians to be present when the patient is to be put to sleep. There are no restrictions on public hospitals.—*Medicine Moderne*.

### PARALDEHYDOMANIA.

**A**FTER morphine and cocaine we will have morpho-mania, etc., but now we have another form of chronic intoxication which is designated paraldehyde-mania. An Edinburg journal mentions this as a new acquisition to our nomenclature, and as having followed in a patient who was dosed for irritability and insomnia. In spite of the disagreeable savor of the drug, it did not tend to prevent its abuse, so that, in time, the victim became so feeble that he had to be spoon-

fed. The nervous and psychical troubles were intense, nevertheless under a long course of treatment he made a complete recovery.—*Gazette of Gynecologie*.

#### OUR PROGRESS IN MEDICINE.

**P**ROFESSOR MCKENDRICK, in pronouncing the opening discourse at the Glasgow University of Medicine said that by modern researches in medicine many human lives were now saved, which were formerly lost; diagnosis was more exact and a knowledge of the medical history of diseases was more deeply studied; treatment was more rational; our means to relieve pain and to make life tolerable in incurable affections were more efficient; and finally when the end came, we rob death of its agony, and our patient passes out of the world in a happy dream.

#### WHO FIRST OPENED WOMAN FOR DISEASES OF HER APPENDAGES

**C**ULLINGWORTH, in his able address on gynecology before the British Medical Association, tells us that Hagar, Tait, and Battey performed resection for diseased ovaries at about the same time. It was in 1872, Hagar on the 27th of July did the first operation at Frebourg, for neuralgia of the ovary with hemorrhage. Five days later Lawson Tait removed the ovaries in a case of large uterine fibroid with excessive metorrhagia. About three weeks after Hagar's operation, Battey of Georgia operated for hystero-epilepsy. Simms coined the term "Battey's Operation" because the latter first fully set forth its purposes and the technique of the operation.—*Gazette de Gynecologie*. September. 1893.

#### Book Notes.

**ETUDE SUR LES ABSCES CHRONIQUE ENKYSTES DE L'AMYGDALE.** Par Le Dr. Eugene Peyrisse, Francais.

Under the above title the author has contributed a monograph on a most interesting subject about which, until recently, little has been written.

The style, in common with the French

school, is classical, and the material is so arranged as to render its study and comprehension easy. He commences by giving the historical part of the subject, but with this there was little to do, hence the bibliographical extracts are few.

The tonsil, he reminds us, is composed of lymphoid tissue and an aggregation of agminated glands. Chronic encysted tonsilitis may follow consecutively upon the acute type. Heredity, lymphatism, arthritism and rheumatism, an anemic state, a tubercular tendency and cold are enumerated as the most common etiological factors. The most common age for tonsillar abscess is from fifteen to forty-six.

The influence of the streptococcus, the *pyogenes aureus* and the *saprophytes* are fully discussed.

From the symptoms of the chronic type set down by the author, we can find little or no distinction between them and those common to the acute variety. It appears, however, that there are varieties in which there are few or no constitutional symptoms; but the patient has pain in swallowing and other local disturbances. In such we are advised to search for fluctuation and to use the exploratory needle.

The prognosis and complications are each separately discussed in a brief and clear style. Many cases are cited in which, on incision, calculi of various sizes, differing in composition, were found.

The importance of a careful diagnosis is emphasized as old, chronic cases, attended with tumefaction and induration of the tonsil, have been confounded with cancer, when an unfavorable prognosis would be given.

Nothing especially new is offered under treatment. We are warned of the importance of keeping constantly in mind the relations of the deep vessels of the neck which course on their way to and from the brain in very close proximity to the almond-shaped gland.

In order to avoid hemorrhage, sepsis, and to destroy the suppurating lacunæ and pellicles the fine galvano-cautery is recommended in preference to the knife.

It is beautifully shown how cocaine, locally applied, supplies anesthesia for all the necessary surgery of the tonsil.

The monograph is a faithful outline of the present status of the pathological changes so commonly observed in chronic interstitial or suppurative tonsilitis. The only just criticism one can advance is that nothing is given on constitutional measures, either prophylactic or remedial, a mistake only too common in late years, with authors on special subjects.

#### Books and Pamphlets Received :

**A PLEA FOR THE APPROPRIATION OF CRIMINALS, CONDEMNED TO CAPITAL PUNISHMENT, TO THE EXPERIMENTAL PHYSIOLOGIST.** By J. S. Pyle, M. D., Canton, Ohio.

**PROCEEDINGS AND ADDRESSES AT A SANITARY CONVENTION HELD AT STANTON MICHIGAN.** Supplement to Report of Michigan State Board of Health.

#### Letter to the Editor.

#### THE FIRST PROFESSIONAL ORGANIZATION.

IN the issue of October 21 thereappeared an article credited to the *Norwich* (Conn.) *Bulletin*, on "The First Professional Orgaization," which states "that the first step toward professional organization and protection in Connecticut was taken by Norwich physicians," who met on March 24, 1774, pursuant to an advertisement of March 3, to consider and prefer a memorial to the General Assembly to regulate the practice of physic. It is stated that "their demand was for the appointment of a committee legally authorized to examine and approve candidates if found qualified," and that "the movement, which was in advance of the age, was negatived in the Lower House." It is also claimed that this was "the initiative step in a series of efforts which have since resulted in the permanent establishment of flourishing State and National Associations, which separate the qualified physician from the 'ignorant pretender.'"

This is an interesting historical statement and, so far as it relates to Connecticut, is undoubtedly true. But it is by no means the initiative step or the earliest effort in the Colonies to organize the profession, or to regulate the practice of medicine. On June 27, 1766, eight years before the Connecticut rally, the

following advertisement appeared in the *New York Mercury*:

"A considerable number of the Practitioners of Physic and Surgery, in East New Jersey, having agreed to form a Society for their mutual improvement, the advancement of the profession and promotion of the public good, and desirous of extending as much as possible the usefulness of their scheme, and of cultivating the utmost harmony and friendship with their brethren, hereby request and invite every gentleman of the profession in the province, that may approve of their designs, to attend their first meeting, which will be held at Mr. Duff's, in the city of New Brunswick, on Wednesday, the 23d of July, at which time and place the Constitution and Regulations of the Society are to be settled and subscribed.

"East New Jersey, June 27, 1766.

On the day appointed, July 23, 1766, a large body of physicians met at New Brunswick, formed themselves into a Society to be known as the New Jersey Medical Society, adopted instruments of association and constitution, and elected a president, secretary and treasurer. Regular meetings were held twice a year the records of which are in possession of this Society.

In 1771, the Society petitioned the Assembly for an act regulating the practice of medicine, and on September 26, 1772, the act was passed. This act required an examination in physics and surgery, approved of, and admitted by any two judges of the Supreme Court, taking to their assistance for the examination such proper persons as they should deem fit, and the Court gave a certificate of examination, without which any one (except those licensed by the crown or physicians from other Colonies) practicing in the colony was liable to a fine. It also legalized physicians fees.

In 1774, an effort was made by the Society to procure a charter, which was delayed by the Revolution, but granted by the State in 1790. There was an intermission of the regular meetings of the Society from 1775 to 1781, because the local situation of the war rendered it dangerous for members to travel through the Colony, and because, also, many of the members took an active part in the

Revolution. As soon, however, as civil government was restored, the society convened, November 6, 1781, at Princeton. The complete records of the Society have been preserved since its organization in 1766, and the Medical Society of New Jersey claims to be the oldest State Medical Society in the United States, and among the first to secure an act from its Colonial Assembly to legalize and regulate the practice of medicine. The first State law regulating medical practice in New Jersey was passed in 1783. Very respectfully,

E. L. B. GODFREY, M. D.

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## CYSTITIS.

WILL you kindly assist me with the following case?

Mr. G. Y., aged 25 years, worked in a factory in New York City until about a year ago, when he was taken with the following symptoms, after having used for some time a water closet with snow and ice on the seat. Increased micturition with slight pain. Frequent desire for urinating and pain gradually increasing until very severe in a month. He then quit work and was treated by a physician for acute cystitis. He came to his home soon after, and the symptoms continued. Soon after he had excruciating pain during micturition, blood following the urine. This continued for some time. Then the hemorrhage ceased but the pain still continues. He was advised by some one to take balsam copaiba, which he says gives him more relief than anything he can take. He also states that some time ago he passed

pieces of mucus. He came to me about three weeks ago for the first time. I at first suspected stricture of urethra, but was able to pass a No. 22 French bougie which gave him intense pain. He passes four quarts of urine in twenty-four hours, alkaline, sp. gr. 10.10, pale, much albumen and pus. I was unable to detect sugar. Has no dropsy or (oedema) whatever. He is emaciated, sallow complexion, weak and debilitated, appetite fairly good. No pain in the back, slight headache, no trouble with the eyes. He is forced to pass his urine every five minutes to every hour or so, and is worse when he lies down. The pain is so severe as to make him cry out at times, when he urinates. He does not sleep well. All medicines except the balsam copaiba seem to aggravate the symptoms.

I desire a complete diagnosis, if such is possible from the description, and a treatment for the same. E. B. W.

[The man has acute cystitis of a severe type. He should be confined to his room, and to the bed whenever the symptoms are acute, avoid alcohol, spices and all volatile oils. He should drink freely of the Elkton Lithia water, and take copaiba as his stomach will bear it. Alkalies, and hyoscyamus soothe the irritability of the bladder, and are preferable to opium suppositories. Washing out the bladder, by Keyes' apparatus, is of use when done properly.—W. F. W.]

DURING the past two years I have been considerably interested in the subject of Dosimetric Medication as set forth by yourself and others.

I am the owner of your "Outlines" and your more recent "Manual."

Nearly one of the first alkaloids listed by the Phil. Granule Co. is *aconitine*, and in seeking information for the dose of this medicine, I find some discrepancies that are puzzling.

Burggraeve in his "New Practical Guide," p. 167, recommends a granule  $\frac{1}{200}$  gr. to a child every one quarter to half hour.

I find also in May number *Medical World*, 1893, page 161, that a dose of  $\frac{1}{500}$  gr. was given along with digitaline and veratrine every half hour, for twenty-four hours, with safe and good results. I also find in your *Outlines* that the dose is put down at  $\frac{1}{500}$  gr., and in your "Manual" the dose is put at  $\frac{1}{1000}$  gr.

and coupled with a caution not to give more than five doses in twenty-four hours.

Though not enjoying a personal acquaintance, I have somehow got to regard your opinions on medicine and have profited thereby in the past, having used your recipes in typhoid fever, cholera-infantum and constipation.

I suppose I should take it for granted that your advice in your "Manual" is the result of your experience, but how is it that such large and repeated doses have been tolerated?

How many doses has it taken, in your experience, to effect a reduction of the pulse in inflammatory cases?

Should you find time to answer this you will confer a great favor on one anxious to use the alkaloids, etc., in an intelligent manner.

H. C. RUGG, M. D.

STANSTEAD, QUEBEC.

[The confusion is due to the variety of aconitines found in the market. Keith advertises aconitin with the dose  $\frac{1}{4}$  to  $\frac{1}{2}$  grain. Many manufacturers list Duquesnel's crystallized aconitine, a preparation no longer made, and which has disappeared from the markets. Other aconitines vary greatly.

I took a granule of  $\frac{1}{100}$  grain amorphous aconite, made by the Philadelphia Granule Co., and placed one-half of the granule on my tongue. The characteristic numbness was still manifest four hours later. Now I submit that a dose capable of producing such decided effects is large enough for ordinary use, and that this dose ought not to be repeated more frequently than I have stated in the "Manual." Less powerful specimens may be given more frequently. In dealing with these potent alkaloids, it must be remembered that they are sharp-edged tools, and must be handled with care. Absorption is rapidly effected, and when so much power is concentrated in so small a bulk, it is thrown upon the circulation at once, and the effect is very great. The best way is to dissolve the drug in water, and give a small dose every ten minutes till the desired effect has been secured.—W. F. W.]

### Note.

A physician in Frankford, Philadelphia, desires a capable young doctor to succeed him. The practice is worth \$2500 a year. Address

Frankford,

Care of TIMES AND REGISTER.

## The Medical Digest.

### SURGERY.

**Treatment of Aneurism by Electrolysis.**—Dr. Verhoogen, of the service of the Hospital of St. John at Brussels, tells us of two cases of external aneurism treated by electrolysis.

The first was of the temporal artery. The tumor, formed of four confluent enlargements, offered all the signs of a true aneurism—vibratory fremitus, systolic souffle, etc. After ten sittings of positive electrolysis, done by means of three platinum needles plunged into the tumor, the duration of the electric current being five minutes and its pressure five milliamperes, a sensible improvement showed itself in the condition of the patient. Fremitus and pains disappeared, the tumor softened, and cure would have been complete if the patient had not quitted the hospital before the end of the experiment.

The electrolytic power of the current consists in decomposition of blood salts during its passage through that fluid, bases going to the negative pole, acids to the positive. It is this free acid which causes the coagulation of the blood. We learn from the interesting experiments of Dujardin-Beaumetz that clots so formed are more adherent than others to vessel walls, thus avoiding all danger of embolism. During their formation they pile up on each other in cup shape, and finish by filling the aneurismal pouch.

The second case was one of an enormous vascular tumor, for the cure of which Dr. Verhoogen intended to arrange an electrolytic treatment a little different from the first.

He preferred to employ the method called interstitial electrolysis, which consists essentially in the operator using electrodes of pure copper. By electrolysis during decomposition, the blood chlorides lose chlorhydric acid, which attaches itself in the form of oxychloride of copper to the positive pole.

Thanks to its extreme diffusibility, and especially to the cataphoretic action of the current, this salt penetrates swiftly through tissues in the area of a zone situated around the needle. It is trans-

ported, so to speak, in its primary condition into morbid tissues, where it exercises a powerful action for change which is capable of producing resolution of tumors. Dr. Verhoogen has practised this method with steady success in a large number of uterine growths.

—*Revue National of Electro-therapie Paris.*

**Practical Removal of Hairs, Moles, etc., by Electrolysis.**—Dr. S. Lorenson, of Racine, Wis., in the *Medical News* writes a practical article on the above subject extracts of which are as follows :

"The theory of the removal of superfluous hair by means of the galvanic current is comparatively simple; it is to insert the needle attached to the negative pole of the battery into the hair-follicle, apply the current, and dissolve the tissues, when the thing will be done. However easy this may seem, when the physician tries to make a success of it in his everyday practice he finds it by no means so simple.

I shall try to give my views of how to make electrolysis a practical success from a practical, almost daily, experience during a period of over two years.

Having a battery of the proper kind, cords, a finger-bowl for water, needle and holder, a pair of small tweezers, and a comfortable arm-chair with some appliance upon which the operator can rest his elbow, one has the essentials for the work. The chair should be placed where a good light will fall on the patient's face, a towel placed in the patient's lap, and upon it a finger-bowl about two-thirds full of water, in which is a sponge-electrode connected with the positive pole of the battery. The cord attached to the negative pole is fastened to the needle holder.

The operator will turn on two cells, seat himself with his back to the light, and sufficiently close to the patient so that he will not have to exert himself in reaching; he will then insert the needle to the bottom of the follicle, then tell the patient to dip one finger into the bowl. In inserting the needle the holder should be held with the same gentle firmness that a pen is held, the third and fourth fingers resting lightly on the skin near the hair to be removed, so as to gently steady the hand.

The first indication of results is a white froth, which makes its appearance at the mouth of the follicle, around the needle. Depending on the strength of the hair and the force of the current, the operator will judge whether the hair is loose. When he wishes to attempt its removal with the tweezers he will ask the patient to remove her finger from the water, and will then seize the hair with the tweezers and make gentle traction; if the hair makes any appreciable resistance the needle must be reinserted and the current again applied. When the hair is entirely loosened by the current a good result may be looked for.

No hard and fast rules can be laid down for doing this work, and each individual operator will be called upon to exercise his judgment in the case of each one upon whom he operates, and much of the time upon the individual hairs.

The part operated upon should be surgically clean. Next the needle should not be inserted more deeply than the bottom of the follicle. Experience will indicate when the needle is at that point by a slight sense of resistance. Should the needle be inserted too far, considerable tissue may be destroyed, and still the hair will not be loose. Another thing to avoid is passing the needle through the side of the follicle, something which experience also teaches one to recognize by the touch. If this be done and the current applied, a white spot will begin to spread around the needle; the result with regard to the hair will be the same as in the former case, and in both a vesicle may form, with some exudation of serum, and with the danger of subsequent pustulation, and formation of a pitted scar.

This rule may also be laid down, that until the operator becomes acquainted with his case, he must be sure not to take the hairs out when they are too close together. This is a matter of a great deal of importance, for frequently patients whose time and money are limited will urge the doctor to take out hairs that are too close together to be operated upon with good results in one day, or even on two successive days.

Again, the temporary inflammation which always sets in does not fully show itself until after several hours, so that a

patient may leave the office with a face that shows comparatively little trace of the operation, but will return the next morning with that part of her face in a very sorry-looking condition. I repeat that the importance of what I have just said cannot be overestimated, for upon proper attention to this matter may depend the success or failure of the operation, at least so far as the question whether or not the patient will have a smooth face after the hairs have been removed is concerned.

As regards the duration of the operation, the amount of time at the disposal of the patient, and the extent of surface covered by the growth, are factors.

Another use to which I have put electricity in the form of the galvanic current is the removal of moles and enlarged cutaneous bloodvessels, such as are frequently seen on and around the alæ of the nose and also on the body of that organ. For convenience, I divide moles into two classes, not that the appliances for removing them are different, but that the *modus operandi* differs somewhat in each. The apparatus for removing moles is the same as that used for the removal of hair, with the exception of the tweezers.

The first class is the very common disfigurement called liver-spots, which are really pigmentary moles, or perhaps, exaggerated freckles. They are little, if at all, elevated above the surrounding surface. The method of procedure in the case of these is as follows: The patient and operator take the same positions as in the removal of superfluous hairs, the parts to be operated upon having been thoroughly cleansed. The operator now inserts the needle at the edge of the mole, just beneath the epidermis, applies the current, which should be weak, and gradually passes the needle through the growth. As the electrolysis goes on it will be observed that a loosening of the pigment takes place, and it mixes with the froth around the needle. The needle must now be worked over the entire area of the mole, taking care to go no more than deeply enough to loosen the pigment. After a few seconds the burning sensation that accompanies the insertion of the needle ceases, in consequence of the local anesthetic effect following the

application for a limited time of a comparatively weak current. The whole operation can be completed with only one puncture of the epidermis, although in small moles that is a matter of little consequence. The pigment and dissolved tissue are now left to dry into a crust, which comes off in a few days, leaving a bluish-red spot, as always happens when a bit of the epidermis has been scraped off, and which later becomes the color of the surrounding skin.

The next class of moles includes those that are elevated above the surrounding surface, and which frequently contain a number of hairs. As a rule, the first thing to do is to remove the hairs, which, if few, can be done at the same sitting the mole is operated upon, and in the manner described in the first part of this paper.

In this class of moles the needle is inserted at the base of the growth and gradually passed through it, and may be passed out at the opposite side. This is repeated until the whole base has thus been treated, the object being to cut off the circulation by electrolyzing the blood-vessels at the base of the growth.

The first sign produced in the mole will be a gradual whitening of that part external to the needle, which finally reaches an appearance of complete anemia. The electrolysis must continue until the circulation is entirely cut off. Inside of twenty-four hours the whiteness will have disappeared and be replaced by a black color. There soon follows a dried, hard crust, the time depending upon the size of the mole, which falls off in a few days, leaving a discoloration that gradually disappears.

As a rule, it is not advisable to attempt to remove a mole at one sitting, unless it be quite small, for fear of leaving a scar.

In recapitulating as to certain things which must always be borne in mind in performing any of the operations I have mentioned:

1. Do not begin with too strong a current.
2. Apply the current for a sufficient length of time.
3. Always apply the negative pole to the part it is desired to destroy.
4. Do not have the circuit closed when you insert the needle until you have

learned to know your patient *electrically*, if such use of the word may be permissible.

5. Always test the strength of your current before beginning. To do this I have found a convenient way is to touch the two poles to my tongue, having the points about an inch apart.

#### MEDICINE.

**An Interesting Experiment.**—M. d'Arsonval, the colleague of the eminent physiologist, Brown-Séquard, has just tried before several scientific gentlemen a very strange experiment. At his invitation two members of the Académie des Sciences, MM. Cornu and Marey, entered into a large wooden cylinder around which was rolled copper wire. When these gentlemen were seated inside, M. d'Arsonval sent through the wire a series of very rapid and powerful electric currents. At the end of some minutes the "patients" said they felt no inconvenience, save that they felt the necessity of breathing more deeply; yet according to scientific law they should have found themselves plunged in an electric bath which would have instantly killed them if the operator had not taken the precaution to change continually the direction of the currents. To prove that the laws of science, as known, were not in fault, M. d'Arsonval invited the two gentlemen to take in their hands incandescent lamps, isolated completely from any wire. Hardly were they in the hands of "subjects" when they lighted up as if they had been really attached to some powerful battery. To prove still further the intensity of electric currents capable of being borne by a man without danger, he gave them as many lamps as their hands could hold, and thus the two *savants* were transformed into six-branched candelabra! The experiment of the disciple of M. Brown-Séquard proves conclusively that man can live at ease in an atmosphere loaded with electricity.—*Med. Press and Circular.*

#### OBSTETRICS AND GYNECOLOGY.

**Diagnostic Value of Electricity.**—Dr. Apostoli (*Centralbl. f. Gyn.*) states

that the faradic current can differentiate between an hysterical ovaralgia and an inflammatory affection of the adnexa. In the first the current will relieve the pain, while in the second it will be of no value. Intra-uterine application of the galvanic current will indicate whether the adnexa are diseased or not by the degree of tolerance. He concludes as follows:

1. Every uterus that tolerates a galvanic current of one hundred to one hundred and fifty milliamperes has a healthy periphery, or at least for the time being there is no inflammation of the adnexa. A simple ovarian cyst does not affect the tolerance.
2. In every instance when the uterus does not tolerate a current strength of fifty milliamperes, and pain or fever follow, the condition of the adnexa is suspicious.
3. If the pains diminish in subsequent applications, then hysteria is present or a retrogression of an inflammatory condition of the adnexa has taken place.
4. If the intolerance increase and if fever set in, then there is present a purulent oophoro-salpingitis which calls for castration.

**The Negative Pole of the Galvanic Current, with Faradization, as Uterine Developer. With Report of Cases.**—Dr. Chas G. Cannady, of Roanoke, Va., contributes an article upon this subject to the New York *Journal of Gynecology and Obstetrics*.

The following are his conclusions:

*First.* That mal-development is more frequent than is supposed.

*Secondly.* That it is responsible for a large per cent of female diseases.

*Thirdly.* That a great many reflex symptoms not generally attributed to this cause are due to mal-deve'opment.

*Fourthly.* That faradization; followed by galvanic current, is the most reliable means we have of developing the uterus.

#### Note.

Much valuable Electro Therapeutic matter will be continued in the next number for want of space.—ED. T. and R.